Petroleum Refineries and Coke Calciners Reporting Guidance
for California's Mandatory Greenhouse Gas Reporting Regulation

Introduction

This document provides guidance for operators of petroleum refineries and coke calciners for the reporting required by the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (title 17, California Code of Regulations, section 95100 *et seq*.) (MRR). Specifically, this guidance document covers the reporting of complexity weighted barrel (CWB) throughputs, Solomon Energy Intensity Indexes (EII®), calcined coke, primary refinery products, finished products, and petroleum products to support the Cost of Implementation Fee Regulation (COI); these data are required to be reported pursuant to sections 95113(l) and 95113(m) of MRR. Product data for refineries and calciners are reported via two spreadsheets that are uploaded to Subpart Y of the California Electronic Greenhouse Gas Reporting Tool (Cal e-GGRT)—one spreadsheet for CWB throughputs and another for EII®, calcined coke, primary refinery product, finished product, and COI products. This guidance document applies to 2014 data reported in 2015, and to data reported in subsequent years.

A separate guidance document for hydrogen production reporting is available at the MRR Reporting Guidance Documents website. For additional information about the requirement to exclude inaccurate data, the use of financial transaction meters, how product data are evaluated during verification for accuracy and conformance with the regulation, and other topics, refer to the Covered Product Data General Reporting Guidance document.

This guidance document describes the requirements of MRR. This guidance document does not, and cannot, create or vary any legal requirements of MRR.

Covered Product Data

Covered product data are all product data used to allocate allowances under sections 95870, 95890, and 95891 of the Cap-and-Trade Regulation, regardless of whether the Cap-and-Trade Regulation imposes a compliance obligation for the data year. All covered product data are subject to material misstatement and conformance evaluation during the verification process. Total facility CWB and calcined coke production are covered product data. Pursuant to section 95131(b)(14)(B)(1), for refineries that do not report an EII® value, primary refinery product volumes are covered product data for the 2014 data year because these volumes may be used to calculate allowance allocation for these facilities. Primary refinery product volumes reported by a refinery that reports an EII® value are not covered product data. All finished products and COI products are not covered product data.

1 Complexity Weighted Barrel (CWB) Reporting

Section 95113(l)(5) of MRR requires petroleum refineries to report annual CWB throughputs for all relevant processes and to calculate and report a total facility CWB value.

1.1 Reporting Throughput Volumes at Standard Conditions

Section 95113(l)(5)(E) specifies that all throughput measurements must meet the full calibration and accuracy requirements provided in sections 95103(k)(1)-(10). To meet these accuracy requirements, liquid CWB throughput volumes must be reported at standard conditions of 60 ℉ and one atmosphere. The volume correction from nonstandard conditions may be calculated by the methods described in the American Petroleum Institute (API) Manual of Petroleum Measurement Standards/American Society of Testing and Materials D1250,[1] the API Technical Data Book,[2] or by comparable means that can be traced to a standard method. In instances where operating temperatures are outside of the range for which the volume correction equations were developed, use of the method beyond the intended temperature range is acceptable.

These calculation methods may be applied post-measurement to a volume metered at nonstandard conditions, or they may be incorporated into the design and function of the meter so that measurements at nonstandard conditions are automatically reported at standard conditions. Input values must be correctly averaged (*e.g.*, when determining the standard volume of a fluid measured at nonstandard conditions, the best weighted-average operating temperature and density of the measured volume must be determined from available information). Reporters must be able to demonstrate to verifiers that volume corrections were applied using the best available information (for example, by showing that the appropriate equations were selected, and that the correct input temperatures and densities were used in the equations), and that the volume measurement meets the calibration and accuracy requirements in sections 95103(k)(1)-(10).

1.2 Reporting Coke-on-Catalyst Volume Percent

The annual coke-on-catalyst volume percent for fluid catalytic cracking (FCC) units must be calculated by the equation in section 95113(l)(5)(C). The mass of coke consumed may be calculated by the equation presented in 40 CFR Section 60.106(b)(3),[3] or by a comparable measurement and mass-balance method. The volume of coke consumed should be calculated from the mass of coke consumed by the following equation:

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[1] American Petroleum Institute Manual of Petroleum Measurement Standards, Chapter 11—Physical Properties Data. Section 1—Temperature and Pressure Volume Correction for Generalized Crude Oils, Refined Products, and Lubricating Oils. Adjunct to: ASTM D1250-04 and IP 200/04.

[2] American Petroleum Institute Technical Data Book—Petroleum Refining, Chapter 6.

[3] http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=1&SID=44004c59c3ae3abc3c62ae2c250afae6&ty=HTML&h=L&r=PART&n=pt40.7.60#se40.7.60_1106

$$Volume\ of\ coke\ (barrels) = Mass\ of\ coke\ (lbs) \times \left(\frac{17{,}655\ \frac{BTU}{lb}}{6{,}050{,}000\ \frac{BTU}{Barrel}} \right)$$

If an annual average coke heat content can be calculated from documented measurements, that value may be used in place of the 17,655 Btu/lb value in this equation. The coke-on-catalyst volume percent must be reported as a percentage with two digits after the decimal point (e.g., 4.29%).

1.3 General CWB Reporting Requirements

- A process unit throughput may be reported under only one CWB unit (section 95113 (l)(5)(E)).
- For all CWB throughputs that are process unit feeds, report only the fresh feed volume and exclude any recycled material (section 95113(l)(5)(A)).
- Classify processes within CWB units based on current function. Refer to the definitions in section 95102(c) and the last column of Table 1 in section 95113 of MRR for information on the processes classified within each CWB unit.
- For CWB units where the reported throughput is an output, such as "Sulfur Recovery" and "Asphalt Production," report only the amount that is actually produced on-site at the facility.
- Throughput for the "Special Fractionation" CWB unit may only include process units that meet the definition in section 95102(c) and are not reported under another CWB unit.
- For the "Fuel Gas Sales Treating & Compression" CWB unit, report the horsepower rating of the unit, not the total power utilized during the year.
- For inclusion in "Total Refinery Input," a material must be brought onto the refinery site during the calendar year, but it need not be processed during the calendar year. "Total Refinery Input" must exclude hydrogen, natural gas, and any input to a hydrogen plant (section 95113(l)(5)(B)).
- The reported "Non-Crude Input" must exclude crude, hydrogen, natural gas, any input to a hydrogen plant, and any material that is not processed in a process unit during the calendar year, such as a non-processed blendstock (section 95113(l)(5)(B)).
- Report all CWB throughputs to, at most, two digits after the decimal point.

2 Solomon Energy Intensity Index Reporting

Refineries that participate in Solomon Energy Reviews must report the current Solomon Energy Intensity Index (EII®) value for the facility. This must be the EII® value that has been issued most recently in a letter or email from a Solomon Associates representative to the facility.

3 Calcined Coke Reporting

Section 95113(l)(2) of MRR requires the annual production quantity of calcined coke to be reported in metric tons (*not* short tons, which is the case for most solid products). Calcined coke production is covered product data, but petroleum coke production is not. To report annual calcined coke production, annual sales data may be used, but the sales data must be adjusted by the change in inventory during the year to accurately reflect the amount of material actually produced during the year.

For reporting 2014 data in 2015, reporters may use best available methods for reporting the annual production volume of calcined coke, as stated in section 95103(h)(1) of MRR.

4 Primary Refinery Product (PRP) Reporting

Section 95113(l)(1) of MRR requires petroleum refineries to report annual on-site production volume of primary refinery product (PRP) by Energy Information Agency (EIA) product code. Section 95102(b) of MRR defines PRP and blending components as follows:

> "'Primary refinery product' means aviation gasoline (EIA product codes 111 and 112), motor gasoline (finished) (EIA product codes 125, 127, 130, 149, and 166), motor gasoline blendstocks (EIA product codes 117, 118, 138, and 139), kerosene-type jet fuel (EIA product code 213), distillate fuel oil (EIA product codes 465, 466, and 467), renewable liquid fuels (EIA product codes 203, 205, and 207), and asphalt (EIA product code 931). For the purpose of calculating this value for each refinery, ARB will convert blendstocks into their finished fuel volumes by multiplying blendstocks by an assumed blending ratio."
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> "'Blending component' means a material blended into a primary refinery product, such as n-butane (EIA product codes 249 and 643), isobutane (EIA product codes 247 and 644), butylene (EIA product code 633), isobutylene (EIA product code 634), pentanes plus (EIA product code 220), ethyl tertiary butyl ether (ETBE) (EIA product code 142), methyl tertiary butyl ether (MTBE) (EIA product code 144), other oxygenates (EIA product code 445), and fuel ethanol (EIA product code 141)."

4.1 General Information for PRP Reporting

For 2014 data in 2015, reporters may use best available methods for reporting the annual production volumes of PRP, as stated in section 95103(h)(1) of MRR.

When reporting annual production volumes, annual sales data may be used, but the sales data must be adjusted by the change in inventory during the year to accurately reflect the volume of material actually produced during the year. When reporting the annual volume of a material produced elsewhere and brought on-site, annual sales data may be used.

The production volume of asphalt should be reported in the PRP table. The mass of asphalt produced should be converted to volume by using a conversion factor of 5.5 barrels per short ton or by using the measured density, which must be determined at least once per calendar year.

4.2 Reporting PRP Volumes and Volumes of Blending Components Produced Elsewhere and Brought On-site

Figure 1 shows the main table from the Cal e-GGRT spreadsheet used to report PRP volumes. The reporting spreadsheet automatically calculates the total annual production volume of PRP based on input to this table from the reporter. Cells requiring user input are blue. Reporters must report the annual production volume by EIA product code for each PRP that is produced. The reporter must also indicate whether the reported volume was produced on-site, or produced elsewhere and then brought on-site. If the volume was produced elsewhere, the reporter must also designate if any of the material was used for purposes other than blending. This information allows the calculated total annual production volume to reflect on-site production that is associated with generated emissions.

Reporters must also report in this table the annual volume by EIA product code for each blending component that is produced elsewhere and brought on-site. For blending component that is produced elsewhere and brought on-site, the reporter must also designate if any of the blending component was used for purposes other than blending.

Figure 1. Example PRP table from the Cal e-GGRT reporting spreadsheet.

Total Primary Refinery Product (bbl):	3,350,000

Product or Blending Component	EIA Product Code	Volume (bbl)	Was the material produced on-site, or was it produced elsewhere and then brought on-site?	If produced elsewhere, was the material used for purposes other than blending?	Contribution to Total Primary Refinery Product
Distillate Fuel Oil, Other 15 ppm Sulfur and Under	465	1,500,000	Produced Onsite	Not Applicable	Added
Motor Gasoline, Finished, Reformulated (Blended with Fuel Ethanol)	125	2,000,000	Produced Onsite	Not Applicable	Added
Fuel Ethanol	141	150,000	Produced Elsewhere	No	Subtracted
Normal Butane - LRG	643	40,000	Produced Elsewhere	Yes	Excluded

4.3 Calculating the Total Annual Production Volume of PRP

The total annual production volume of PRP must only include material produced on-site at the facility during the calendar year. PRP and blending components that are produced elsewhere and then brought on-site may not contribute to the total annual production volume reported for PRP. PRP and blending components that are produced elsewhere, brought on-site, and used exclusively for blending must be subtracted from the total annual production volume reported for PRP.

The total PRP volume calculated by the reporting spreadsheet only includes the volume of PRP produced on-site. In general, the volume of any blending component that is produced elsewhere should be subtracted from the total because the volume of that blending component increases the reported volume of a PRP, but production of that blending component does not contribute to on-site emissions. Thus, the volume of any PRP or blending component that was produced elsewhere and only used for blending on-site (*i.e*., the answer to "was the material used for purposes other than blending" is "No") is subtracted from the total volume in the calculation of total PRP. The total PRP volume excludes the volume of any PRP or blending component that is produced elsewhere, brought on-site, and used for purposes other than blending into a PRP (*i.e*., the answer to "was the material used for purposes other than blending?" is "Yes").

Table 1 summarizes how PRP and blending components contribute to the total PRP volume depending on their location of production and on-site use.

Table 1. Contributions to the total PRP volume calculation.

Product category	Contribution to Total PRP Volume		
	Added	Excluded	Subtracted
PRP produced on-site	X		
PRP produced elsewhere and used only for blending on-site			X
PRP produced elsewhere and NOT used only for blending on-site		X	
Blending component produced elsewhere and used only for blending on-site			X
Blending component produced elsewhere and NOT used only for blending on-site		X	

An example calculation of total PRP volume is shown in Figure 1. The total production volume of PRP is equal to 3,350,000 barrels, which is calculated by adding the 1,500,000 barrels of diesel produced on-site and 2,000,000 barrels of reformulated gasoline produced on-site and then subtracting the 150,000 barrels of fuel ethanol that was produced elsewhere and used exclusively for blending. The 40,000 barrels of normal butane that were produced elsewhere and used (at least partially) for purposes other than blending are not subtracted from the total PRP volume because the actual volume used for blending cannot be determined due to its multiple on-site uses.

The final column in Figure 1 automatically indicates whether the reported volume is added to the total PRP volume, subtracted from the total PRP volume, or excluded from the total PRP volume calculation.

5 Finished Product Reporting

Refineries must report the annual amounts of each petroleum product listed in either Table C-1 of 40 CFR Part 98 or Table MM-1 of 40 CFR Part 98 that exited the refinery gate during the year, consistent with Subpart MM of the U.S. EPA Mandatory

Greenhouse Gas Reporting Regulation (40 CFR §98.393). To report these finished product amounts, reporters must select the appropriate product from the pulldown menu in the finished products table in the Cal e-GGRT reporting spreadsheet, and then enter the amount in the appropriate units. Sales data may be used to report the annual finished product amounts. The amount of any product that is combusted on-site as fuel (*e.g*., as part of refinery fuel gas) must not contribute to the reported volume of finished product. Emissions from the combustion of this type of fuel must be reported pursuant to section 95115 of MRR for stationary combustion emissions.

Material reported in the primary refinery products table must also be reported in the finished products table. For example, if 2,500 bbl of ultra-low sulfur diesel is produced on-site and exits the refinery gate, then that volume should be reported both in the primary refinery prdoucts table and the finished products table. ARB expects these materials to be reported in both tables and these will not be double-counted.

Finished product data reported pursuant to section 95113(l)(3) are separate from the supplied fuel data reported pursuant to section 95121 that are used to calculate supplied fuel combustion emissions, and they are also separate from the product data reported pursuant to section 95113(m) used to calculate COI fees.

6 Product Reporting for the Cost of Implementation Fee Regulation

Section 95113(m) contains new product reporting requirements to support the COI Fee Regulation. Petroleum refineries must report the annual volume of all CARBOB, finished gasoline, and California diesel that exits the refinery gate and is intended for sale or use in California. These reported volumes will be used by ARB to calculate cost of implementation fees only; they will not be used to determine any compliance obligation under the Cap-and-Trade Program. The point of regulation for COI is at the refinery gate, so reported volumes should be the volumes exiting the refinery gate, not the volumes sold at the rack. Sales records may be used to report the product volumes exiting the refinery gate.

7. Additional Information

Detailed training materials for reporting using Cal e-GGRT:
http://www.arb.ca.gov/cc/reporting/ghg-rep/tool/ghg-tool.htm.

The GHG Mandatory Reporting Regulation, with full requirements:
http://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-regulation.htm.

Contact the MRR helpdesk: ghgreport@arb.ca.gov.

Contact the MRR verification helpdesk: ghgverify@arb.ca.gov.

For help with reporting, please contact the appropriate staff member:
http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-contacts.htm.

For help with verification, please contact the appropriate staff member: http://www.arb.ca.gov/cc/reporting/ghg-ver/ghg-ver-contacts.htm.